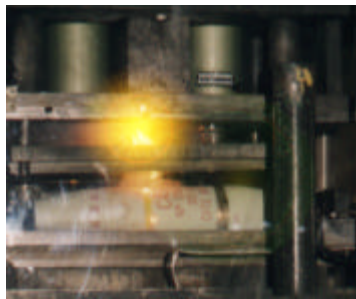
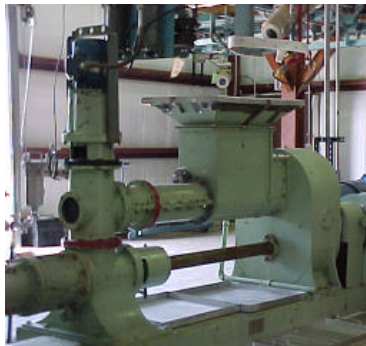


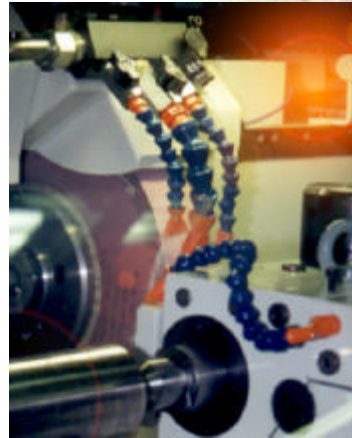
CRANE

Manufacturing

Renovation



Demilitarization



Handling
& Storage



Maintenance



Pyrotechnics



CRANE ARMY AMMUNITION ACTIVITY

Crane Army Ammunition Activity

Activity Commander
Civilian Executive Assistant
Executive Officer

Liaisons

Navy |
Marine Corps |
Air Force |

Special Assistants

Safety |
Contracting |
Security |
Internal Review &
Audit Compliance |
Total Quality Management |

Directorates

Resource Management |
Depot Operations |
Industrial Operations |
Engineering |
Letterkenny Munitions Center |

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■ *Mission Statement*

To receive, store, ship, produce, renovate and demilitarize conventional ammunition and related components

www.crane.army.mil



■ *Vision Statement*

We are and will remain the best producer and supplier of conventional munitions to the fighting ground, sea and air forces. Our commitment to quality will make our customers demand our services above all others. We are committed to continuous measurable process improvement throughout the organization.

Environmentally Sound Processes

Our ongoing goal is to minimize waste streams and maximize resource recovery and recycling (R3). Our White Phosphorus to Phosphoric Acid Conversion Plant represents one effort in this direction. At full scale operation level since 1989, the facility has a maximum capacity to process up to 11,500 pounds of white phosphorus a day, producing 48,000 pounds of phosphoric acid with a 75 percent concentration in a 24-hour period.

Flexible Manufacturing

Our investment in modernization of facilities and equipment supports a wide array of technologically-challenging ordnance items. This provides us with the flexibility to quickly respond to low quantity requirements, and to rapidly transition to full scale production.

Concurrent Engineering

Our extensive ordnance production experience and technical capabilities allow us to work closely with design agents to enhance the producibility of ordnance items, and to validate Technical Data Packages through the production of LowRate Initial Production quantities.

Quality Control - ISO 9002 Certified

To maintain process control, we perform in-process inspections, to include functional testing on press, cast, and pyrotechnic assemblies, nondestructive tests, temperature and humidity controlled testing, chemical and analytical analysis of material components, and tensile strength testing.

Product Assurance

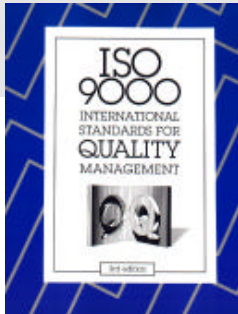
Our product assurance services include a Quality Assurance Plan for each production project, a Technical Data Package review for quality provisions, Statistical Process Control, product inspections, audits, gage design and calibration, and acceptance testing capabilities.

Partnering/Teaming

CAAA performs projects with both public and private sector agencies. We have a mutually beneficial exchange of services with our Navy host, and engage in joint projects with other Armed Services. CAAA has teamed with industry using cooperative research, development agreements and direct sales authority.

Your Needs Are Our Mission

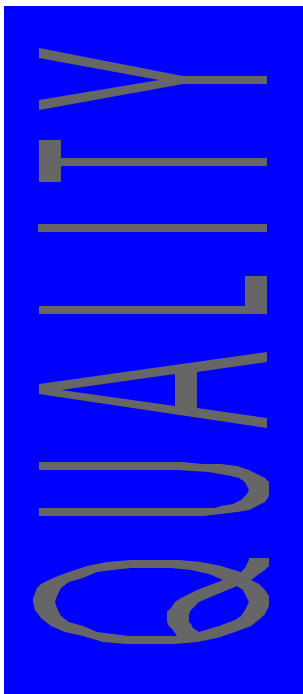




Commitment to Quality

Providing Quality Ordnance Products
to the DoD's Warfighters
in an Efficient and Timely Manner

PRODUCT ASSURANCE



To ensure our processes, we perform in-process inspections, to include functional testing on press, cast, and pyrotechnic assemblies, nondestructive tests, temperature and humidity controlled testing, chemical and analytical analysis of material components, and tensile strength testing.

Nondestructive testing capabilities include numerous types of x-ray equipment such as 160KV Real-time, a 300KV portable unit, a 420KV stationary unit and a Curie Cobalt 60 Gamma radiography unit. Our two chemical analysis laboratories are fully equipped with the latest state-of-the-art instrumentation.

TIER ONE LOGISTICS



Tier I Activities



As one off our Tier I depots, we store prime warfighting and training assets for the DoD. We have storage buildings with a capacity of over 650,000 short tons.

Above Ground Storage

Magazines

Smokeless Powder/Projectile

High Explosive

Black Powder

Fuze and Detonators

Warhead



Included in this total is 50,000 short tons of Category I and Category II munitions stored under the required security conditions. While your munitions are stored at CAAA, they will be subjected to our aggressive surveillance program and continually updated inventory program with a 99% accuracy rate. When it comes time to move them, you will benefit from rapid load-out accomplished through prompt on-installation location, lot selection, pre-shipment, and our ready access to rail and truck lines.

Shipping and Receiving Capabilities

Rail/Truck Access

Blocking and Bracing

Sea/Land Containers

Speciality Transporters on Hand to Facilitate Material Movement

Super Stacker

50K Rough Terrain Container Handler

Auto Railer

Hi-Lo Trailers

Surveillance

Our surveillance organization performs serviceability inspections and monitors ammunition suspension and restriction in accordance with service specific guidance to ensure correct ammunition condition code visibility for use by the owning service. It also supports shipping, receiving, storage, disposal, and breakdown operations and conducts safety-in-storage inspections. CAAA has been selected to support the Army function test mission and will be utilizing the Universal Function Test Range.

INVENTORY



CAAA's Inventory Accountability Program has been recognized as "Superior" by the Operations Support Command (OSC). CAAA has received OSC's "Gold" medal for "exceptional performance and solid execution of the inventory program" because of consistent participation and diligent completion of program parameters and milestones for 100% reconciliation.

In 1998 we also assumed responsibility for the inventory at the Ravenna Army Ammunition Plant. We completed a 100% inventory and reconciliation one week ahead of schedule with a 100% accuracy rate.

Recognized as a leader, CAAA implemented the use of bar code readers to scan and upload AT4 rocket launcher serial numbers. This automated reporting is being considered by the OSC for implementation at all of its installations.



100%
accuracy

Automated Identification Technology

AIT

The Automated Identification Technology (AIT) effort continues with CAAA as the prototype. The focus of the AIT effort is to develop a database that will be the central source for providing total visibility, timely and accurate information on the location, movement, status and identity of material from the depot to the war fighter in transportation and supply systems. HQ, OSC has plans to integrate AIT into all Tier I and Tier II activities. Personnel within CAAA have assisted in the design and development of this project. Automation will include but not be limited to use of radio frequency tags, handheld and fixed interrogators, etc.

RENOVATION

& Exterior Maintenance

Ordnance and pyrotechnic renovation work is accomplished in any number of flexible manufacturing units. Remote defuzing and refuzing capabilities are available for items up to and including 16" projectiles. Propellant charge renovation is accomplished in multiple facilities configured with powder lofts.

Exterior maintenance is performed on ordnance and ordnance related items such as containers, metal pallets, and wire cages using CO₂ pellet blasting, grit blasting, high pressure water cutting, degreasing, and painting processes.



High Pressure Water Jet



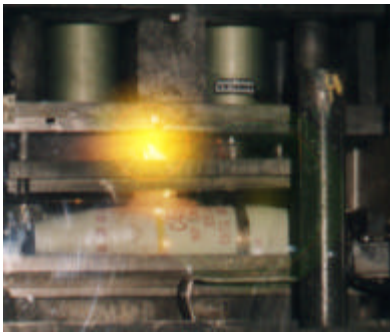
FuzeX-Ray



Renovation



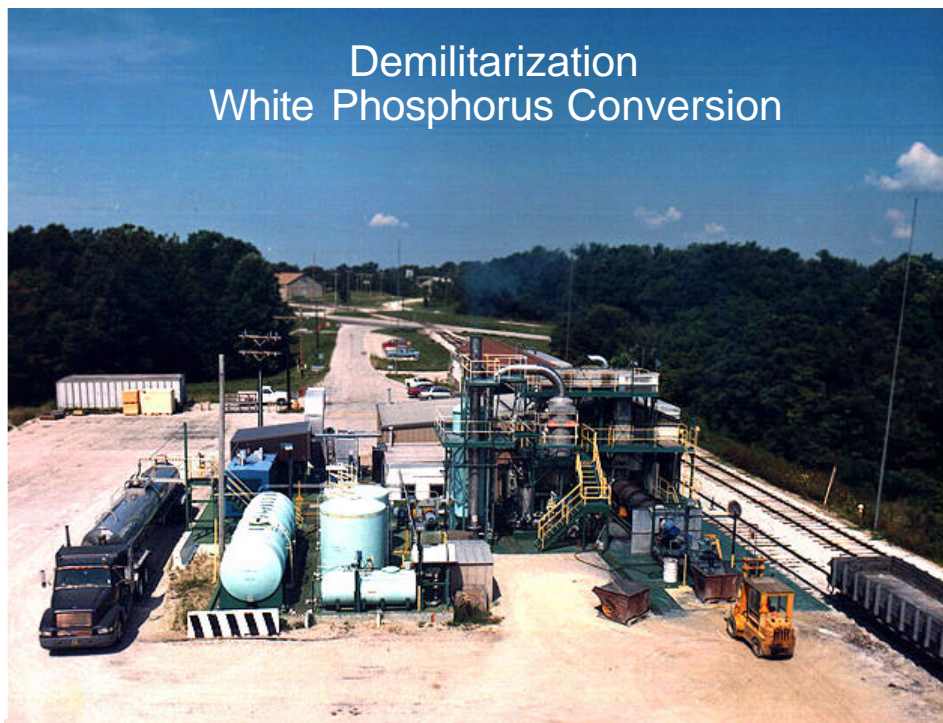
Extrusion



Disposing of excess or obsolete ammunition explosives is critical for safety of the ammunition stockpile and maintaining storage space for "goto war" items. Resource recovery methods are critical to efficient demilitarization processes. CAAA makes every effort to ensure it recovers the maximum amount of material from munition items it demilitarizes.

Current methods utilized are:

- Autoclave melt-out
- Automated high pressure washout
- Breakdown
- Steam-out
- Open burning
- Open detonation
- CO₂ pellet blasting
- WP Conversion



Demilitarization
White Phosphorus Conversion

The White Phosphorus(WP) to Phosphoric Acid Conversion Plant represents a one of a kind resource recovery system which is totally contained and derives saleable phosphoric acid from WP munitions. At full-scale operational level since 1989, the facility has a maximum capability to process up to 11,500 pounds of white phosphorus a day. In a 24 hour period, the facility produces 48,000 pounds of phosphoric acid with a 75 percent concentration.

DISPOSAL



40 Acre Open Burning Ground

For demilitarization operations and production scrap disposal purposes, we use our 80 acre demolition range with a capacity of 35,000 pounds (70 shots@500pounds per pit). Also, our 40 acre ammunition burning grounds can support demil programs and daily production operations. Burn facilities include 20 pans for explosives or propellants, 2 pyro scrap pans, 1 black powder burnpan, 8 red phosphorus burn pans, 2 burn pits, 3 dewatering units, 1 pipe fed

burnpit, 1 incendiary burn cage/pit and 1 contaminated vehicle washrack. The Rifle Range remote burn area has 3 explosive burn pads for explosive related materials. These facilities permit us to dispose of explosive propellants and explosive loaded items in various quantities.

These areas, as well as all CAAA operations, fully comply with both State and Federal environmental regulations. To ensure further compliance, CAAA has an erosion control plan, ground and water monitoring, seismology study modeling and noise control measures in place.



LETTERKENNY MUNITIONS CENTER

Receive, Store & Issue Ammunition and Missiles
Assemble, Test, Modify & Disassemble Missiles
Renovate Ammunition
Demilitarize Ammunition and Missiles
Provide Rail and Travel Service to the Depot



Letterkenny Munitions Center is a government owned, government operated installation. The physical area consists of 19,243 acres, 2,500 of which are dedicated to industrial operations. Approximately 1,300,000 square feet of floor space is dedicated to the performance of the maintenance mission. There are 66 buildings within the maintenance area and an additional 1,083 buildings in Letterkenny's 12,000 plus acre ammunition area.

Located in south central Pennsylvania, near Chambersburg, Letterkenny is four miles from the intersection of Interstate 81 and U.S. Route 30, providing easy access to seaports and air travel. Proximity to local airports is 25 miles to Hagerstown, MD, 45 miles to Martinsburg, WV, and 50 miles to Harrisburg International Airport, PA.

Letterkenny is served by CSX (Chessie System) railway. During the past decade Letterkenny has spent more than \$64 million dollars upgrading, expanding, and modernizing facilities. Letterkenny has state-of-the-art technology for soil and ground water remediation, potable water treatment and distribution, sewage collection/treatment, and natural resources management.

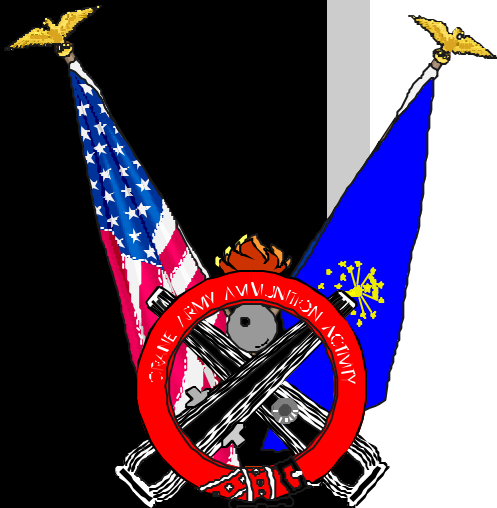


WORLD CLASS MANUFACTURING

Pyrotechnics
Cast Loading
Press Loading

Production

Our production capabilities can meet your needs with 209 production buildings. CAAA has the capability to produce items as diverse as detonators weighing 20 grams, to shock test charges weighing 40,000 pounds. Coupled with the "can do" attitude and flexibility of our workforce, CAAA delivers a quality product in a responsive and cost effective manner to the satisfaction of our customers.



12 Crane Army Ammunition Activity





Center Of Technical Expertise For Pyrotechnics

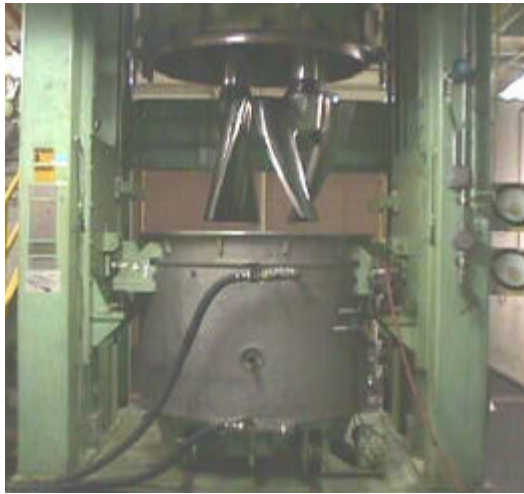
CAAA is a recognized center of technical expertise in the research, development and production of pyrotechnic devices including:

- Signal, smoke, illuminating and infrared (IR) items (Pressed/Extruded)
- Illuminating projectiles
- Marking devices
- IR flares for illumination in conjunction with night vision devices

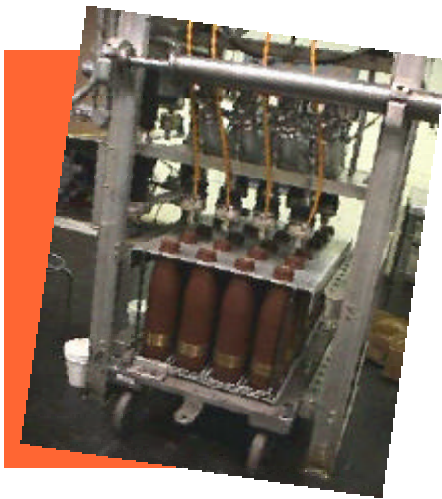


PYROTECHNICS

INSENSITIVE MUNITIONS



Batch mixing and casting of Plastic Bonded Explosives (PBX) is accomplished using our 300 gallon Baker Perkins high shear mixer equipped with automatic loading features. A recent success is our production of 5"/54 projectiles. PBX pressloading capabilities include standard 4-post presses, and an opposing ram press with heated mold and vacuum used to produce explosive charges for the Sparrow Warhead.



Cast Load

CAAA has the ability to produce cast loaded explosives utilizing five production lines with mixing, melting and holding kettles. Our diverse processes and expertise enable us to melt and pour explosives with many different characteristics, including HBX, H-6, Tritonal, Composition B, TNT, PBX and Octol. We produce bombs, mines, shock test charges, demolition charges, rocket warheads, underwater sound signals, cluster bombs, and projectiles. Equipment is also available to thermally coat munitions.



Press Load

With the availability of 42 presses in seven heavily reinforced facilities, our workforce can press load various compositions, such as Tetryl, Composition A-3, and PBX. From a single ram 500 ton press, to multiple ram high volume presses, operators can load 76mm, through 165mm projectiles, missile warheads such as Sparrow and Sidewinder, pyrotechnic items, and a variety of actuating devices and boosters.

Ordnance Engineering Services

Concurrent Engineering
In-process Design Reviews
Technical Data Package
 Development and Provability
 Producibility Reviews
Low Rate Initial Production
Full-scale Production Engineering
Facilities Management
Engineered Standards
Equipment Specifications
Production Equipment
Tooling and Fixtures
Computer Aided Design
Computer Aided Manufacturing



ENGINEERING

MAJOR FUNCTIONS

Fabricate Tools, Dies, Fixtures,
Tooling, Gages, and Production
Equipment

Manufacture Ammunition
Components and Related Items

Apply Required Finishes
(Plating, Painting and Powder
Coating)

Continuous Quality Control

Engineering Support

Welding Capabilities

TIG

Arc

MIG/Oxyacetylene

Spot

Flame

Plasma Cutting

Heat Treating

Annealing

Normalizing

(Stress Relieving)

Air/Oil/Water Hardening

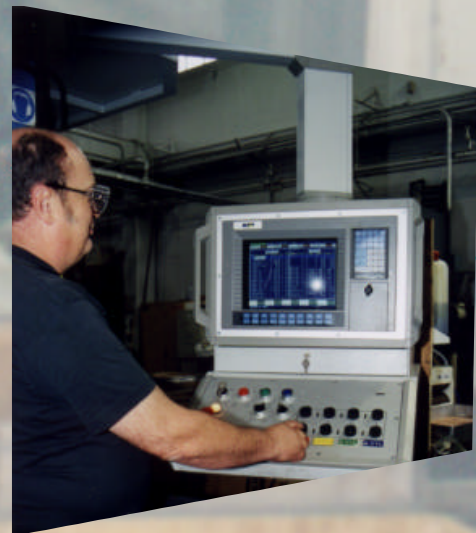
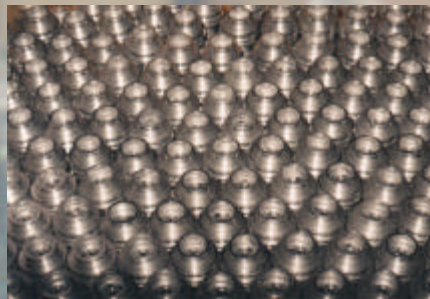
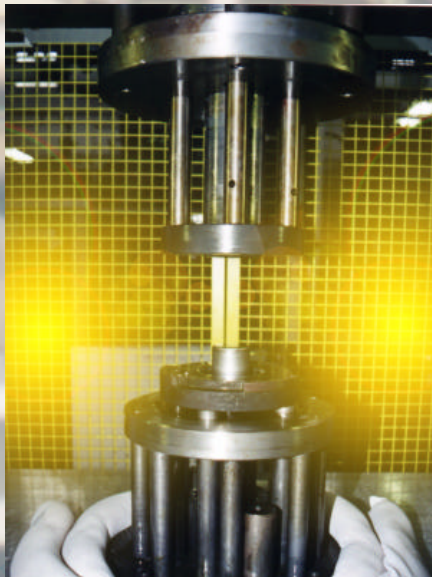
Carburizing

(Case Hardening)

Carbon Nitriding

Carbon Restoration

Deep Freeze



MACHINING CENTER

CAA's machine shop is equipped with the latest manufacturing technologies and equipment. A full complement of modern CNC machines (mills, lathes, laser fabrication center, wire electrical discharge machine, etc.) offers versatility to machine a multitude of configurations. We have specialized and unconventional machine equipment which gives us formidable manufacturing capabilities for all types of materials including tough alloys and exotic metals.

Capabilities

Boring, Drilling, Milling,
Turning
(upto 36" diameter x 13' long)

Grinding
(surface, thread, internal,
centerless, etc.)

Sheet Metal Fabrication
(Computerized Numerical Control
(CNC) punch press, bending
brakes, folding, rubber pad
pressing, etc.)

Heat Treat
(annealing, normalizing,
hardening, etc.)

Laser Cutting

CNC Wire Electrical
Discharge Machine

Deep Draw Press

Inspection Equipment
(Cordax, Optical, Comparators,
etc.)

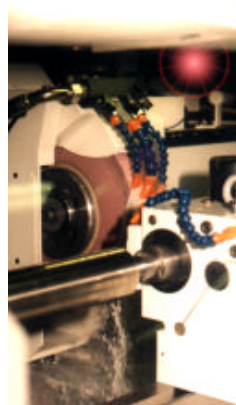
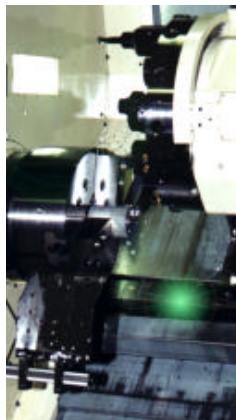
Waterjet Machining

Forming

Computer Aided Design
(CAD)

Computer Aided Machining
(CAM)

Reverse Engineering



Inspection

Video Non-Contact
Measuring
Equipment
Coordinate
Measuring
Machines
Hardness Testers
Surface Finish
Plating Thickness
Optical Comparator



Cleaning and Finishing Processes

Chemical Cleaning
Ultrasonic Cleaner
Turbo Washer

Plating (CyanideFree)

Nickel (Brush)

Chromate

Zinc Phosphat

Phosphate

Passivation

Zinc

Tin

Conversion

Iron

Titration, Atomic Absorption
Salt Spray Testing

Powder Coating

Statistical Process Control

Workstation Automated Data Collectors

SHARED CRANE RESOURCES



Ordnance Testing Capabilities

NavySurface WarfareCenter
CraneDivision
<http://www.crane.navy.mil>

Range Operations

R&D, First Article, Lot Acceptance
Surveillance

Malfunction Investigation

Insensitive Munitions

Hazard Classification

Hand-held, hand-tossed, pistol/projector-fired,
countermeasures, target illuminating, target screening,
demolition materials, special purpose munitions

85-acre Ordnance Test Area

5-pound Net Explosive Weight (NEW) Class 1.1

4 operating and 2 support buildings

Army Surveillance Function Test Range

PointofContact: Steve Turpen
(812)854-3986
turpen_steve@crane.navy.mil



Dynamic/Climatic Testing

Vibration, Mechanical Shock, Shock Response, Jolt, Jumble

Temperature, Altitude, Salt Fog, Temperature/Humidity,

Temperature/Altitude, Sand and Dust, Temperature/Humidity/Altitude

23,000 sq ft building with cells from 10-pound NEW limit to bays with

100-pound NEW limit

2200 sq ft building with 3000-pound NEW limit (1.1)

PointofContact: Sam Bair
(812)854-5135
bair_sam@crane.navy.mil

Chemical Analysis and Materials Sciences

Failure evaluations; thermal characterization analysis; predictive technology on service life, corrosion rate and compatibility of materials; testing for material selection/compatibility for explosives, propellants, pyrotechnics, metals, polymers, ceramics, adhesives, coatings and compositions

Impact sensitivity, friction sensitivity, electrostatic sensitivity, vacuum thermal stability, thermal stability, Large Scale GAP, CAP, Self heating (DSC), Henkin Autoignition, unconfined burn, pellet density, toxicity

High Performance Liquid Chromatography, Gas Chromatography, Gel Permeation, DuPont Moisture Analyzer, Karl Fisher Moisture Analyzer, Ion Exchange Chromatography,

Flame and Graphite Furnace Atomic Absorption,

Gas Chromatography/Mass Spectrometry

PointofContact: Nancy Maegerlein
(812)854-5506
maegerlein_nancy@crane.navy.mil

SELF-HELP PROGRAM

Reservists, National Guardsmen, and Volunteers are cutting firebreaks and removing railroad track and ties in preparation for building a truck access road into a magazine. Other initiatives include drafting, lunch & locker room renovation and railroad maintenance and repair.



Commander
Crane Army Ammunition Activity
300 Highway 361
Crane, IN 47522-5099
www.crane.army.mil



CRANE ARMY AMMUNITION ACTIVITY

A Tier I Activity



Engineering
Manufacturing
Renovation
Demilitarization



Storage
Handling
Shipping
Inventory

U.S. Army Operations Support Command